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EP 0600700 A1

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(54) Adjustable steering column

(57) The steering shaft (1) is mounted within a column tube (2); a bracket (3) having bracket members (4, 5) secures the tube to a vehicle; adjustment between tube and bracket is provided by slots (16, 17 and 36, 37) preferably in antifriction elements (12, 13 and 38, 39); a clamping arrangement (20, 21, 24) is provided which has a central clamping axis (A) which intersects at (C) the steering shaft axis (B) so that the clamping force to secure the tube (2) relative to the bracket (3) acts through the intersection at (C) resulting in a reduction of the downward extension of the construction including a clamping handle (54) which preferably extends under the column tube.

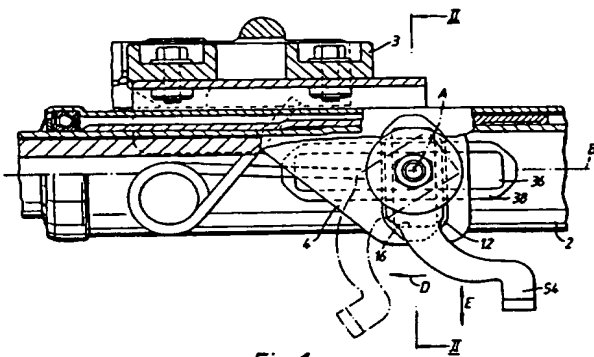


Fig.1

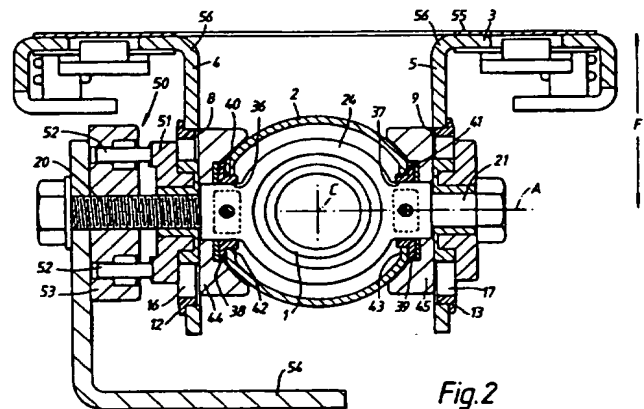


Fig.2

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

GB 2 295 445 A

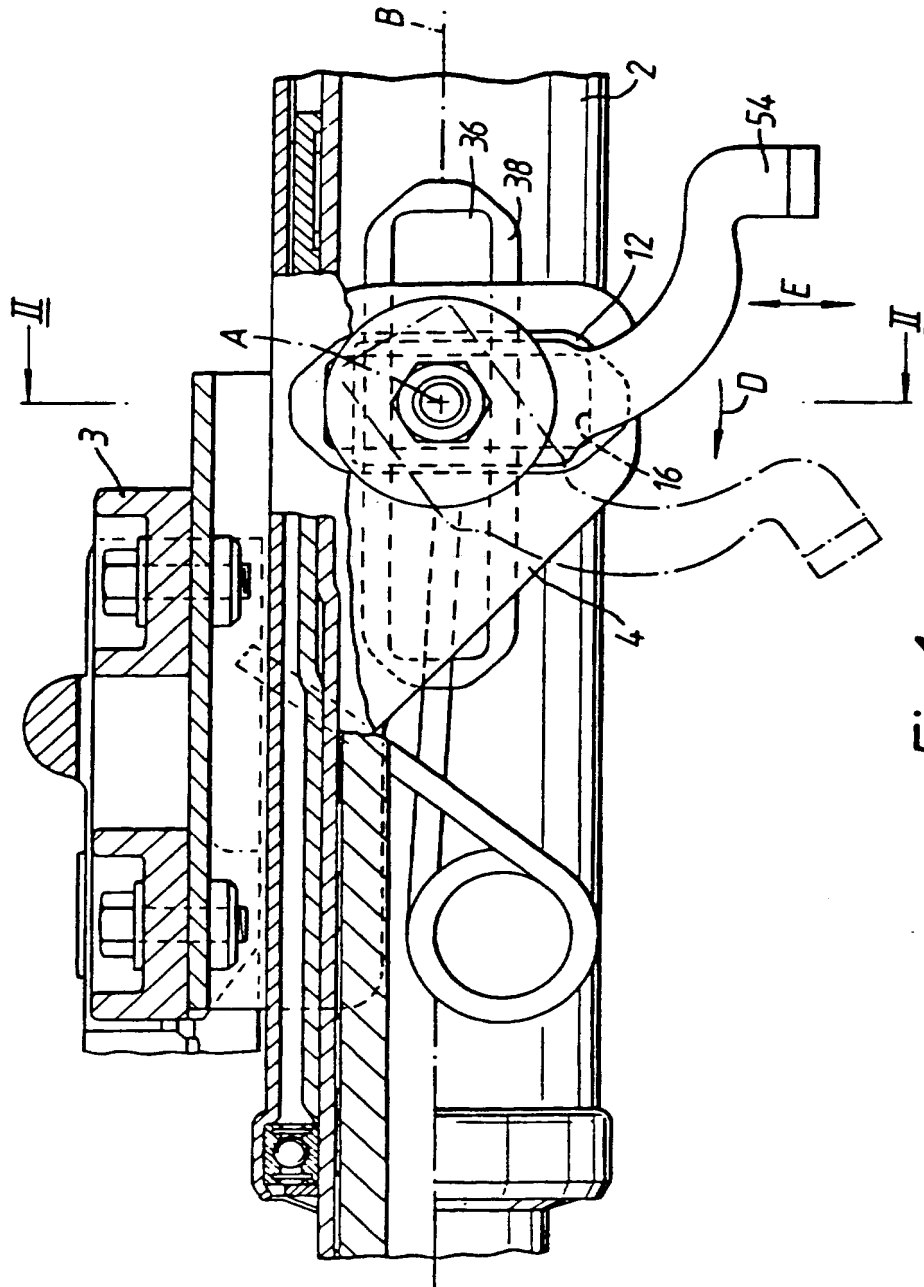


Fig. 1



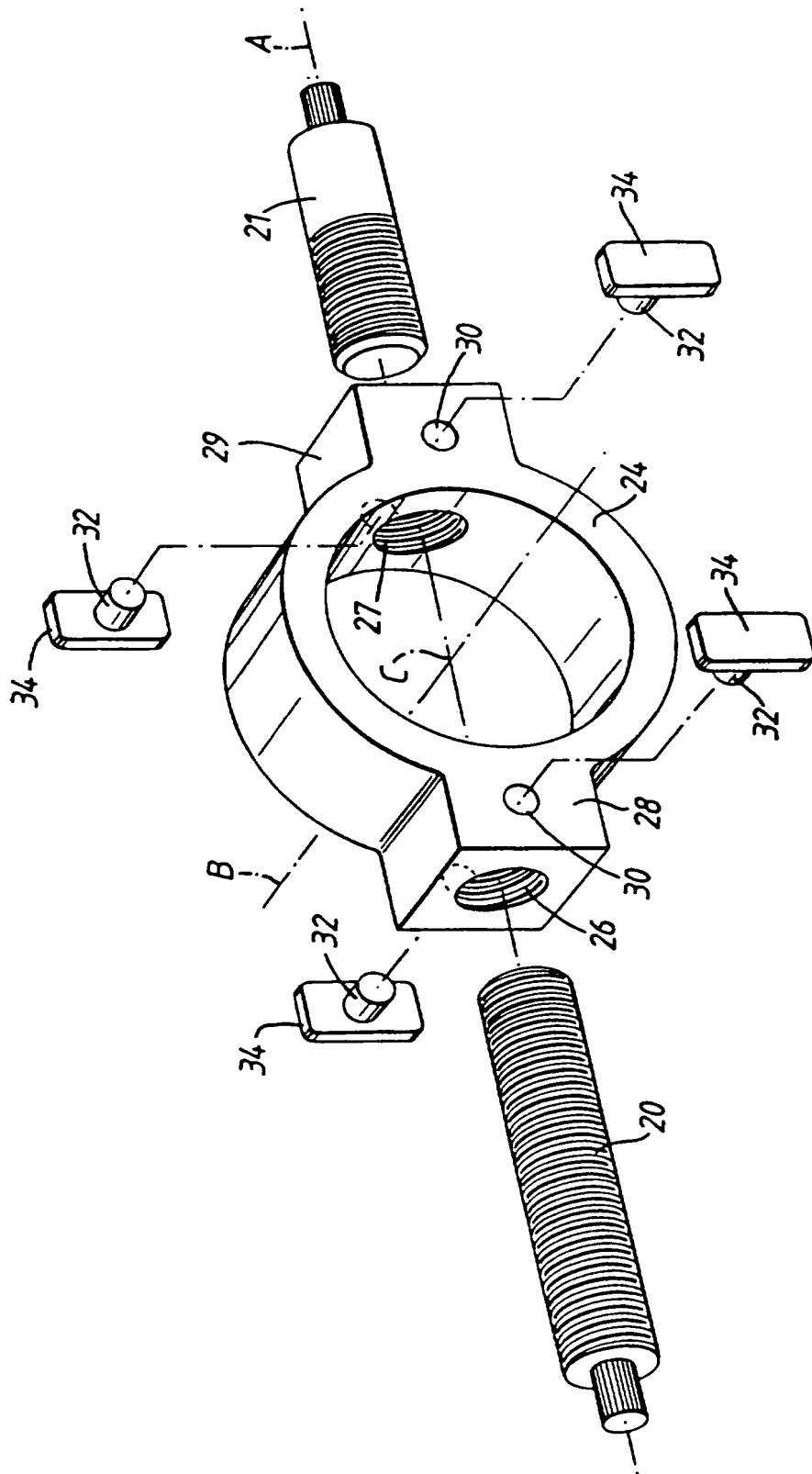


Fig. 3

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ADJUSTABLE STEERING COLUMN

5 The present invention relates to an adjustable steering column construction for a vehicle and to a clamping mechanism for use with such an adjustable steering column.

10 It is known from our present PCT Application No. PCT/GB94/01431 to provide a clamping mechanism for a steering column in which bracket members extend from a column mounting and further bracket members extend from the column to a bolt which can be loosened to allow adjustment between the brackets. The bolt extends between the brackets below the column so that the clamping force between the bracket members
15 is even. This arrangement, however, has the disadvantage that the bracket members and associated parts extend into an area where space above the driver's knees is at a premium.

20 Accordingly, the present invention comprises an adjustable steering column construction in which a steering shaft is mounted within an outer column tube, and comprising a bracket for securing the column tube to a vehicle, bracket members extending from the bracket either side of the column tube, relative adjustment between the bracket and the column tube
25 being provided by means of longitudinal slots, clamping means extending between the bracket members to clamp the tube to the bracket characterised in that the clamping means has a central clamping axis which intersects the steering shaft axis.

30 By moving the clamping axis from below the steering shaft axis to that of steering shaft axis it is possible to provide more room for the driver. Preferably the clamping means is formed with a central portion which surrounds the steering shaft. The column tube may have flattened sides with longitudinal
35 apertures to receive antifriction elements enabling linear adjustment of the column tube relative the column bracket. These elements may have soft stops at each end formed as shown

in our copending patent application No 9423187.5 filed on 17.11.94. The clamping means hereafter referred to as a yoke alternatively may have soft stops formed as resilient inserts on each side to abut at each end of linear slots of the antifriction elements mounted to the column tube.

The yoke preferably has extensions horizontally each side in a direction at right angles to the steering shaft which extensions pass through further antifriction elements which are slotted to allow vertical adjustment of the column tube and steering shaft, the further antifriction elements being carried in the bracket members of the bracket. One said extension from the yoke may be arranged to carry a clamping device actuated by a clamping handle arranged to clamp the yoke to the bracket members. The clamping handle preferably extends from said one extension to below the column tube.

An embodiment of the invention will now be described with reference to the accompanying drawings in which:-

Figure 1 is a part sectional side view of a part of an adjustable steering column construction for a vehicle including clamping mechanism according to the invention.

Figure 2 is a cross section of the construction of Fig. 1 taken on II-II, and

Figure 3 is a perspective view of a yoke member forming part of the clamping mechanism.

In Figure 2 there is shown a steering shaft 1 mounted within an outer column tube 2. Tube 2 is supported by a bracket 3 which secures the column tube 2 to a vehicle. Bracket members 4 and 5 extend from the bracket 3 either side of the column tube to vertical slots 8 and 9 respectively in which are

located antifriction elements 12 and 13 which are similar to those shown in our co-pending British Patent Application No. 9423187.5. These elements 12 and 13 have longitudinal slots 16 and 17 which receive horizontal studs 20 and 21 aligned in a central clamping axis A which intersects the steering shaft axis B and C. The studs 20 and 21 form part of a clamping means similar to that shown in our European Patent Application published as EP 0600 700 A1 as will be described. A further part of the clamping means is a central portion formed as a yoke 24 which surrounds the steering shaft 1. Studs 20, 21 are screwed into threaded holes 26 and 27 in extending portions 28 and 29 of the yoke, so that the studs form extensions to the yoke in the horizontal direction A at right angles to the steering shaft axis B. Holes 30 either side of each extending portion 28, 29 aligned parallel to axis B are arranged to receive a protrusion 32 from each of four rubber or elastomer stops 34 which act as buffer stops to cushion the yoke as it slides either way in the axial direction B in linear longitudinal slots 36 and 37 in linear antifriction elements 38 and 39 which are similar to but longer than elements 12 and 13. Elements 38 and 39 are located in linear longitudinal apertures 40 and 41 respectively in flattened sides 42 and 43 of the column tube 2. Packing members 44 and 45 are provided between bracket members 4 and 5 and the column tube 2.

The clamping means further comprises a cam means 50 in the form of a cam 51 and two or more rollers 52 mounted in a roller housing 53 to which a clamping handle 54 is fixed. This arrangement is as described in our European Patent Publication No. 0600 700 A1 and functions in the same way so that movement of handle 54 in direction D (see Fig. 1) causes an unclamping action to allow column tube 2 to be adjusted linearly in direction B or for rake in a direction E which although is angled to the vertical will be called vertical for

the purposes of this description.

5 Whilst the yoke 24 surrounds shaft 1, it is possible to construct the yoke without an upper or a lower portions whilst still maintaining its axial extensions that is the studs 20, 21 in axis A.

10 It will therefore be seen that when compared with earlier steering column clamps, the bracket members 4,5 and handle 54 of the invention extend downwards from the steering shaft axis B substantially less and therefore allow more leg room under the steering column. Furthermore, since the clamping force on bracket members 4,5 is applied at a reduced distance F
15 between the upper extent 55 of the bracket 3 as compared with the prior art there is less stress at points 56 where the bracket members turn from their horizontal portions to their vertical portions.

C L A I M S

1. An adjustable steering column construction in which a steering shaft is mounted within an outer column tube, comprising a bracket for securing the column tube to a vehicle, bracket members extending from the bracket either side of the column tube, relative adjustment between the bracket and column tube being provided by means of longitudinal slots, clamping means extending between the bracket members to clamp the tube to the bracket characterised in that the clamping means has a central clamping axis which intersects the steering shaft axis.

2. A construction according to claim 1 wherein the clamping means is formed with a central portion which surrounds at least part of the steering shaft.

3. A construction according to claim 1 or 2 wherein the column tube has flattened sides with longitudinal apertures to receive antifriction elements which in turn receive extensions from said central portion.

4. A construction according to any one of claims 1 to 3 wherein the central portion has an extending portion on each side extending horizontally from the central portion and wherein resilient stops are provided on each side of each extending portion in a direction parallel to the axis of the steering shaft.

5. A construction according to any one of claims 1 to 4 wherein the central portion completely surrounds the steering shaft.

6. An adjustable steering column construction substantially as described with reference to the accompanying drawings.

6

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

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Relevant Technical Fields

- (i) UK Cl (Ed.M) F2Y (Y5Q)
(ii) Int Cl (Ed.5) B62D 1/18

Search Examiner
JOHN TWIN

Date of completion of Search
15 DECEMBER 1994

Databases (see below)

- (i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
1-6

(ii)

Categories of documents

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.
- Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	EP 600700 A1 (TORRINGTON)	

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).